

Application No. 09/902,529

Filed: July 10, 2001

TC Art Unit: 3724

Confirmation No.: 6863

AMENDMENT TO THE CLAIMS

1. (Currently amended) A method for perforating a non-woven sheet of fibers or filaments comprising the steps of:

fixing on a perforated cylinder at least one insert, including, at one end, a plane surface, and provided with a recess that emerges in said plane surface, that has an inner surface and that has a sharp edge formed by the intersection of the inner surface with the plane surface;

bringing the non-woven sheet into contact with the perforated cylinder and with the plane surface of the insert;

bringing a perforating member facing to the recess of the insert to locally compress fibers or filaments of the non-woven sheet between the perforating member and the sharp edge of the insert and thereby cause the perforating member to translate along an axis;

moving the perforating member in rotating movement about an axis parallel to the translation axis and cutting out a portion of the non-woven sheet by shearing of the fibers or filaments of the non-woven sheet compressed between the perforating member and the sharp edge of the insert through the combined actions of rotation and pressure.

2. (Previously Presented) Method according to claim 1, characterized in that, at the time of a perforating operation, said perforating member is driven simultaneously in rotation in a first direction of rotation and in translation in a first direction opposite from the perforated cylinder, and then is driven simultaneously in rotation in a second direction of

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rotation opposite from said first direction of rotation and in translation in the direction opposite from the first direction of translation.

3. (Previously Presented) Method according to claim 1, characterized in that each insert is removable.

4. (Previously Presented) Method according to claim 3, characterized in that each insert is fixed by screwing onto the perforated cylinder.

5. (Previously Presented) Method according to claim 2, characterized in that the direction of screwing of each insert corresponds to the first direction of rotation of a perforating member.

6. (Previously Presented) Method according to claim 1, characterized in that each insert comprises a plane flange.

7. (Previously Presented) Method according to claim 1, characterized in that the recess of an insert has a diameter that increases starting from the sharp edge.

8. (Withdrawn) Apparatus for perforating a non-woven sheet (N) of the type comprising a perforated cylinder (2) and at least one perforating member (9) which is capable of being driven simultaneously in translation and in rotation about its own axis, characterized in that the perforated cylinder (2) is equipped with at least one insert (8), including, at one end, a plane surface (S), and provided with a recess (8b) that emerges in said plane surface (S), and which has a sharp edge (8g) formed by the intersection of the inner surface (8f) of said recess (8b) with

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said plane surface (S), and in that the perforating tool (9) is capable of cooperating with said sharp edge (8g) so as to cut by shearing the fibers or filaments of the non-woven sheet (N), between the sharp edge (8g) of said insert (8) and said perforating member (9) driven simultaneously in translation and in rotation about its own axis.

9. (Withdrawn) Apparatus according to claim 8, characterized in that said perforating member (9) is designed to be driven in rotation in a first direction of rotation (R1) when it is moved in translation in a first direction (H) opposite from the perforated cylinder (2), and to be driven in rotation in a second direction of rotation (R2) opposite from said first direction of rotation during its movement in translation in the direction (G) opposite from the first direction of translation (H).

10. (Withdrawn) Apparatus according to claim 8 or 9, characterized in that each insert (8) is removable.

11. (Withdrawn) Apparatus according to claim 10, characterized in that each insert (8) is fixed by screwing onto the perforated cylinder (2).

12. (Withdrawn) Apparatus according to claims 9 and 11, characterized in that the direction of screwing of each insert (8) corresponds to the first direction of rotation (R1) of a perforating member (9).

13. (Withdrawn) Apparatus according to claim 8, characterized in that each insert (8) comprises a plane flange (8e).

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14. (Withdrawn) Apparatus according to claim 1, characterized in that the recess (8b) of an insert (8) has a diameter that increases starting from the sharp edge (8g).

15. (Previously Presented) Method according to claim 2, characterized in that each insert is removable.

16. (Previously Presented) Method according to claim 4, characterized in that the direction of screwing of each insert corresponds to the first direction of rotation of a perforating member.

17. (Withdrawn) Apparatus according to claim 9, characterized in that each insert is removable.

18. (Withdrawn) Apparatus according to claim 11, characterized in that the direction of screwing of each insert corresponds to the first direction of rotation of a perforating member.

19. (New) A method for perforating a sheet, comprising:

providing a rotating plurality of dies, each die having a sharp edge defining a shape;

providing a counter-rotating plurality of punches;

bringing one side the sheet into contact with at least some of the dies;

bringing at least one of the punches into contact with the other side of the sheet at a position that corresponds to a respective at least one of the dies to locally compress a portion of the sheet between the punch and the sharp edge of the die;

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driving the punch such that the punch rotates about a longitudinal axis of the punch; and

cutting out a portion of the sheet, wherein the rotation of the punch and the compression of the sheet together cause shearing of the portion of the sheet compressed between the punch and the sharp edge of the die, thereby cutting out the portion of the sheet.

20. (New) The method of claim 19, wherein driving the punch comprises:

translating the punch along the longitudinal axis in a direction away from the die and simultaneously rotating the punch in a first direction about the longitudinal axis; and then

translating the punch along the longitudinal axis in a direction toward the die and simultaneously rotating the punch in a second direction, opposite the first direction, about the longitudinal axis.

21. (New) The method of claim 20, further comprising:

mechanically linking the punch such that, if the punch translates along the longitudinal axis in the direction away from the die, the punch is driven to rotate in the first direction.